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| 09/464,167 | 12/16/1999 | HIDETO SUZUKI | P/1905-91 | 7202 |

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| EXAMINER |
|---|
| MUNOZ, GUILLERMO |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2634 | |

DATE MAILED: 01/14/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. 09/464,167 | Applicant(s) SUZUKI, HIDETO | |
|---|---|---|---|
| | Examiner Guillermo Munoz | Art Unit 2634 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If the period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *16 December 1999* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-6* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,5 and 6* is/are rejected.

7)☒ Claim(s) *4* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *16 January 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *7* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:411

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-3, 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rich et al (US Patent Number 5758271) in view of Seki et al (US Patent Number 6473451).

In regards to claims 1 and 5; Rich et al teaches a CDMA receiver wherein:

- "FIG. 2 illustrates a detailed block diagram of the radio receiver 104 of FIG. 1 in accordance with the present invention. Generally, FIG. 2 illustrates further detail of the receiver 108 and the gain controller 112. The receiver 108 generally includes a first band pass filter 202, a variable attenuator 204, a variable gain amplifier 206" (col.6, lines 46-51). The variable gain amplifier 206 is equivalent to claimed variable gain amplifier in claim 1, line 4 and claim 5, line 4.
- "In the preferred embodiment of the present invention, the quality 130 of the received signal 124 comprises a ration indicative of the desired signal to the received signal 124. Preferably, in a CDMA system, the ratio comprises an energy per chip of the desired signal (Ec) to a total power spectral density of the received signal (Io). The quality 130 of the received signal 124 may be derived from various signal points in the radio receiver 104" (col.6, lines 20-27, Fig.2).

The received signal 124 is equivalent to claimed reception characteristics of reception signals received from the plurality of users prior to interference cancellation in claim 1, lines 4-7; and claim 5, lines 5-7.

- "The gain of the radio receiver (104) is adjusted responsive to the quality (130) of the received signal (124) to optimize the quality (130)" (abstract, lines 9-11). Adjusting the gain of the radio receiver to optimize the quality of the received signal is equivalent to claimed controlling gains prior to baseband decoding of the reception signals so as to maximize improvements of the reception characteristics of the reception signals on the basis of an evaluation result in claim 1, lines 9-12 and claim 5, lines 9-13.

Rich et al teaches that "receiver front end gain is set sufficiently high to overtake the worst case receiver back end noise figure to achieve acceptable sensitivity" (col.3, lines 42-44); that the high front end receiver gain results in reduced linearity; that increasing the DC biasing of the back end circuitry increases the receiver linearity while producing undesired power dissipation on battery-operated radios.

Furthermore, Rich et al teaches that the signal quality "may be derived from various signal points" within the receiver, but is silent on comparing signal quality of two signal points within the receiver.

Seki et al teaches a DS-CDMA receiver having a signal to interference power ratio measuring apparatus comprising:

- "the base station 60 includes an interference canceller 61 and an SIR calculation section 62 which form the signal to interference power ratio measuring apparatus 20 according to the first embodiment. The base station 60 further includes a decoder 63, a transmission frame production section 64 and a comparison circuit 65" (col.7, lines 32-35).
- "Comparison circuit 65 compares an SIR value of each user measured by the SIR calculation section 62 with an aimed SIR value set in advance and outputs a result of the comparison" (col.7, lines 53-56).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to make the CDMA receiver's signal processor disclosed by Rich et al with the signal to interference power ratio measuring apparatus in view of Seki et al for the purpose of comparing signal to interference power ratio from section 62 with the ration indicative of the desired signal to the received signal 124 at the front end of the receive in order to reduce receiver power dissipation while reducing the level of interference.

In regards to claims 2; as applied to claims 1, Seki et al teaches a DS-CDMA canceller wherein:

- "The base station 60 includes an interference canceller 61 and an SIR calculation section 62 which form the signal to interference power ratio measuring apparatus 20 according to the first embodiment" (col.7, lines 32-35). The signal to interference power ratio measuring apparatus is equivalent to claimed SN (Signal-to-Noise) ratio reception characteristics to be compared and evaluated in claim 2, lines 1-3

In regards to claim 3, Rich et al teaches a DS-CDMA receiver comprising:

- "FIG. 2 illustrates a detailed block diagram of the radio receiver 104 of FIG. 1 in accordance with the present invention. Generally, FIG. 2 illustrates further detail of the receiver 108 and the gain controller 112. The receiver 108 generally includes a first band pass filter 202, a variable attenuator 204, a variable gain amplifier 206" (col.6, lines 46-51). The variable gain amplifier 206 is equivalent to claimed variable gain amplifier in claim 3, lines 3-4.
- "The gain controller 112 in combination with the receiver having gain 108, demodulator 110, the signal quality determiner 111 and the signal processor 114 forms a novel apparatus" (col.5, lines 47-50). The demodulator 110 is equivalent to claimed preliminary demodulation section in claim 3, line 5.
- "The signal quality determiner III can comprise an error rate estimator for estimating an error rate of the demodulated signal 126" (col.6, lines 28-30). The error rate estimator is equivalent to claimed reception characteristics of the reception signals received from the plurality of users prior to the interference cancellation processing in claim 3, lines 6-8.
- "Preferably, the gain controller 112 is operational when the quality 130 of the received signal drops below a predetermined threshold" (col.6, lines 9-11). The gain controller is equivalent to claimed reception quality collection section for collecting comparison results from all the interference cancellation stages when the interference canceller determines that the degree of improvement of the

reception characteristics is low, a control signal is so generated as to correct the current gain to the AGC in claim3, lines 15-19.

Rich et al teaches that "receiver front end gain is set sufficiently high to overtake the worst case receiver back end noise figure to achieve acceptable sensitivity" (col.3, lines 42-44); that the high front end receiver gain results in reduced linearity; that increasing the DC biasing of the back end circuitry increases the receiver linearity while producing undesired power dissipation on battery-operated radios.

Furthermore, Rich et al teaches that the signal quality "may be derived from various signal points" within the receiver, but is silent on comparing signal quality of two signal points within the receiver.

Seki et al teaches a DS-CDMA receiver having a signal to interference power ratio measuring apparatus comprising:

- "the base station 60 includes an interference canceller 61 and an SIR calculation section 62 which form the signal to interference power ratio measuring apparatus 20 according to the first embodiment. The base station 60 further includes a decoder 63, a transmission frame production section 64 and a comparison circuit 65" (col.7, lines 32-35).
- "The SIR calculation section (signal to interference power ratio calculation section) 62 calculates signal to interference power ratios (SIR) from interference powers and received powers calculated by the interference canceller 61 described above" (col.7, lines 43-47). The SIR calculation section is equivalent to claimed

section for measuring and obtaining the reception characteristics of the reception signals for the respective interference cancellation stages upon the interference cancellation processing in claim 7, lines 11-14.

- "Comparison circuit 65 compares an SIR value of each user measured by the SIR calculation section 62 with an aimed SIR value set in advance and outputs a result of the comparison" (col.7, lines 53-56). Comparison circuit 65 is equivalent to claimed section for comparing the reception characteristics of the respective interference cancellation stages upon the interference cancellation processing with the reception characteristics prior to the interference cancellation processing

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to make the CDMA receiver's signal processor disclosed by Rich et al with the signal to interference power ratio measuring apparatus in view of Seki et al for the purpose of comparing signal to interference power ratio from section 62 with an error rate of the demodulated signal 126 in order to reduce receiver power dissipation while reducing the level of interference.

In regards to claim 6; as applied to claim 5 above, Rich et al teaches a CDMA receiver wherein:

- "The variable gain amplifier 206 amplifies the attenuated signal 228 responsive to a second gain control signal 133 from the gain controller 112" (col.7, lines 3-5). The gain controller 112 is equivalent to claimed AGC controller generates a gain control signal for controlling the gain of said variable gain amplifier in claim 6, lines 1-3

- "Preferably, in a CDMA system, the ratio comprises an energy per chip of the desired signal (Ec) to a total power spectral density of the received signal (Io)"(col.6, lines 23-25). The ratio of energy per chip to total power is equivalent to claimed Eb/No (energy per signal bit/noise power spectrum density) used as the reception characteristics to be compared and evaluated in claim 6 lines 3-8.

### *Claim Objections*

Claim 4 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

### *Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Guillermo Munoz whose telephone number is 703-305-4224. The examiner can normally be reached on Monday-Friday 8:30a.m-4:30p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on 703-305-4714. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9313 for regular communications and 703-872-9313 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-306-0377.

GM
January 7, 2003

STEPHEN CHIN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600